DOCUMENT RESUME

ED 176 212 CS 004 948

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TITLE Observations of Kindergarten and First Grade Children's Development of Oral Language, Concepts about Print, and Reading Readiness.
PUB DATE [78]
NOTE 38p.; Research prepared at Texas Womans University

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *Beginning Reading; Concept Formation; Kindergarten Children; *Language Development; *Language Skills; Measurement Techniques; Primary Education; *Reading Ability; Reading Instruction; *Reading Readiness; *Reading Research; Syntax
IDENTIFIERS *Oral Language

ABSTRACT

A study originally involving 56 children from four schools was undertaken to observe the development of children's oral language and concepts of print during the kindergarten year using the Record of Oral Language (ROL) and the Concepts about Print (Sand) tests. In addition, the Sand test was administered early in the first grade to the available original participants, and their scores on the Metropolitan Readiness Test (MRT) given at the beginning of first grade were obtained. The results indicated that the children's performance on the ROL and Sand tests increased significantly across time. Age was not a significant factor for either test; but sex was for the Sand test, with females scoring higher. The syntactical competence of kindergarten children continued to develop as measured by the ROL. The findings suggest that if acquisition of all the concepts of print that are incorporated in the Sand test are necessary for success in formal reading, then many first grade children do not have the necessary cognitive entry behaviors to succeed in formal reading instruction at the beginning of the year. They also suggest that some of the concepts are, or can be, acquired after a child is reading. (FI)

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Observations of Kindergarten and First Grade Children's Development of Oral Language, Concepts About Print, and Reading Readiness

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Children's reading ability continues to be a concern of school administrators, teachers, parents, and of the children themselves. The positive relationships among a child's oral language, reading ability, and subsequent success in school has been well established (Chomsky, 1972; Larrick, 1975; Loban, 1963; Strickland, 1962). The quality of language to which a child has been exposed before entering school has been shown to be important. The more exposure a child has had to language that closely resembles the language which he/she will be required to read, the more it is likely that he/she will experience success with the reading task (Hildreth, 1964; Milner, 1951; McCormick, 1977). Lundsteen (1977) views reading as an extension of oral language; therefore, the greater and richer the oral language experiences, the more able a child will be to relate and make sense out of print.

In addition to becoming competent language users, children acquire knowledge and experience in regard to vocabulary, sentence types and sentence patterns, and ability to gain meaning from connected discourse. Through imitation of parents' behaviors, the child becomes aware of behaviors necessary for success in reading: how to hold a book, that one reads the print and not pictures, importance of picture cues, recall, enjoyment of reading, and language facility to understand and appreciate the story (Smith, 1975). Clay (1974) feels that in order to bridge the

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gap between nonreading and reading, the child needs to "discover arbitrary conventions of how books are presented" (p. 275). These concepts about print deal with book orientation, directionality constraints, first and last, punctuation, word and letter reversals, capital/lower case correspondence, letters, and words (Clay, 1972).

Since children vary widely in their language and reading abilities, it is important to be able to identify the abilities that each child has in order to determine the level of instruction. Moreover, it is important to identify these abilities early so that any confusions or misconceptions can be straightened out. Downing and Oliver (1973-74) have demonstrated that children may not have the same concept of what constitutes a sound, letter, or word that their teacher assumes they do. Reid (1966) found that children may refer to a word as a letter, may not know what a sentence is, nor have they any expectation of what this "thing" called reading is all about.

Clay (1975) has found that these confusions (letters and words, directional constraints, that print rather than pictures is read, etc.) may persist well into the first year of school. Lundsteen (1977) also supports the fact that these confusions may remain well into the first year of formal reading instruction. In order to gain from reading instruction, perhaps these early print or prereading concepts need to be acquired by children. Bloom (1976) refers to learning which is needed for or is a prerequisite for a particular task as "cognitive entry behaviors" (p. 30).

The initial study reported in this paper was undertaken to determine what "cognitive entry behaviors" or concepts about print kindergarten

children possess. Knowledge of print-related concepts was assessed by Clay's (1972) Concepts About Print (Sand) test, and the child's oral language performance was measured by the Record of Oral Language (ROL) developed by Clay, Gill, Glynn, McNaughton, and Salmon (1976). In addition, the relationship between these two aspects of prereading ability, knowledge of print concepts and oral language ability, was examined. Further studies were conducted to determine what changes in these measures, if any, occured across time and what influence the age and sex of the child had on performance.

Since both instruments (Sand and ROL) were developed in New Zealand, used with New Zealand children, and are relatively recent tests, the test-retest and split-half were studied to determine the stability of the tests and their applicability for use with American children. To determine the concurrent validity of the Sand and ROL, a study was conducted using the subtests of the Metropolitan Readiness Test (MRT) obtained at the beginning of the first grade as criteria. The Sand test was also given at the beginning of the first-grade year to determine the children's "cognitive entry behaviors" of the reading process.

Finally, in order to examine the internal structure of the Sand test, a factor analysis of the Sand for each of the four administrations was performed. It was felt that some of the items of the Sand test measured similar or identical knowledge of concepts of print and that items, therfore, would group into several patterns.

Methods

Subjects

The participants were randomly selected from the kindergarten

students enrolled in four elementary schools of a urban community school district. These four schools had 14 kindergarten classrooms and seven teachers. The teachers provided the investigator with a list of the children in each class; there were 265 children. Children were eliminated from the list if they could not speak or understand English, if they were six years of age before September 1, 1977, or if they had any hearing, vision, or motor handicap that would prevent them from following directions or responding. Sixteen children were excluded for these reasons. From the remaining 249 children, 75 were randomly selected; the parents and/or guardians of 61 (81.3%) of those selected agreed to allow their child to participate.

Five of the 61 families moved during the 1977-78 school year so the study was based on the responses of the remaining 56 children. There were 29 males and 27 females who had mean ages of 68.2 (S.D. = 3.3) and 69.1 (S.D. = 3.8) months, respectively, at the beginning of the study. Based on their ages at the beginning of the study, the participants were divided into three age groups, 63 through 66 months, 67 through 70 months, and 71 through 75 months. Eleven (18%) of these children were members of a minority group, a figure very close to the 1975 figure of 16.8% for the school district. Fifty-one of the participants were enrolled in the school district the following year (1978-79) and continued to participate in the study.

Instruments

ROL. The Record of Oral Language (ROL) developed by Clay, et al. (1976) was used to assess the participants' oral language. Clay, et al. (1976) feel that a major advantage of a sentence repetition task such as the ROL is

that one may observe the child's control over syntactical structures in a relatively short period of time. Theoretically, if a child has not internalized certain structures, he will not be able to repeat them.

The Levels Sentences of the ROL consists of three groups of sentences of varying difficulty. Each level consists of seven types of sentences, each differing in its grammatical structure. There are two examples of each sentence type within each level; the set of the first examples make up Part 1 and the second examples make up Part 2. Sentences are scored correct only if they are repeated exactly as given; therefore, a child can score between zero and 42. Since the ROL was developed for use with New Zealand children, there were a few words (six) that were determined to be unfamiliar to American children. These words were changed to their American synonyms with the permission of one of the authors (Glynn, 1977).

Sand. The Concepts About Print (Sand) test developed by Clay (1972) was used to assess the children's reading readiness or prereading behaviors. The Concepts About Print test is a children's picture book (entitled Sand) that the investigator reads to the child and asks the child questions about it during the reading. There are 24 items or concepts concerning book orientation, directional constraints, knowledge of punctuation, letter, word, capital/lower case correspondence, line-, word-, and letter-inversions. The possible scores on the Sand can range from zero to 24. Clay (1972) feels that the test can be used to determine "concepts yet to be learned or confusions to be untangled" (p. 12).

Procedures. The children's performances on these two instruments (ROL and Sand) were observed on three occasions during the kindergarten year: November 16 to December 5, 1977; January 9 to January 17, 1978;

and February 27 to March 9, 1978. In addition, the Sand test was given to the available 51 participants on a fourth occasion during the period of September 21 to 28, 1978. At this time, the MRT scores were obtained for 48 subjects (24 males and 24 females); since three boys were in either a resource room or in kindergarten again, MRT scores were not available for them.

During the testings the participants were interviewed individually in a quiet area away from other children in sessions lasting 15 to 20 minutes. Within each measurement occasion, the order of testing was alternated across participants. The first three sessions were audio recorded and responses were verified at a later playback.

Results

ROL and Sand Across Time

A 3 x 2 x 3 repeated measures analysis of variance design was used to analyze the data generated by the ROL and the Sand; age and sex of the subjects were between-subjects variables, and time of testing was the within-subjects variable. Significant F values were followed by the Newman-Keuls test. The means and standard deviations for the first three observations are presented in Table 1.

The analyses revealed that the mean number of sentences on the ROL repeated correctly increased significantly from the first to the third occasion, F (2, 100) = 26.13, $p < .001$. It would appear that the syntactical competence of these kindergarten children continued to develop throughout the school year. Although older children tended to score higher

than younger children and females scored higher than males, these differences were not significant ($p > .05$).

Analyses of the Sand scores revealed that the scores increased significantly across time, F (1, 100) = 139.50, $p < .001$. Toward the end of the kindergarten year, the average child obtained a score of less than half (10.8) on the Sand. If knowledge of awareness of these concepts is necessary for success in reading, then these findings suggest that the average kindergarten child may not be linguistically or cognitively ready to benefit from formal reading instruction.

The mean Sand score for the fourth administration, given at the beginning of the first grade, was 13.0 which was significantly higher than the mean of the third administration, t (50) = -5.4, $p < .001$. Even though the average Sand score increased significantly from March, 1978 (10.8), to September, 1978 (13.0), the increase was still relatively small in light of the total possible score (24). It would appear that knowledge of all Sand items is not crucial for successful reading. Indeed, at the time of the third observation in March, four children were identified as reading _____. Their mean Sand score at that time was 16.2. In addition, the females' overall mean (10.4) was significantly higher than the males' (8.0), F (1, 50) = -4.25, $p < .05$. Although it is not surprising that the females scored higher than the males in this language task, it is rather puzzling that there were no significant differences on the ROL which is also a language task. One explanation may be that females are attuned to print-related concepts before males. No significant differences among ages were detected; although the older children did tend to score higher than younger children.

Table 2 presents the percentage of participants responding correctly to the Sand items across the four administrations. The percentages were compared with the Q test of differences for related proportions (McNemar, 1969) to determine if the changes across time were significant. The change in response to 12 items was very highly significant ($p < .001$). Three items experienced a highly significant change ($p < .01$), and three others also experienced a significant change ($p < .05$). The remaining six items did not have a significant change across administrations. Two of those six items experiencing no significant change were identified correctly by virtually all of the children at the first administration. The remaining four items experiencing no significant change were answered correctly by none, one, or two children at the beginning of first grade. Therefore, the overall number of print-related concepts acquired by children increased during their kindergarten year.

Test-retest and Split-half

At this point, there is very little information available concerning the reliability of the ROL and Sand. The tests were developed and have been used primarily with New Zealand children (Clay, et al. 1976; Clay, 1972) so little information about their usefullness with American children is available.

Test-retest and split-half reliability coefficients were computed for the three ROL administrations and for the four Sand administrations and are presented in Tables 3 and 4. As noted in Table 3, both the ROL and the Sand test have very good stability across time, all coefficients for the total scores are above .73. The ROL split-half coefficients were obtained by odd-even correlations. The coefficients do not differ significantly for

males and females. Again, the split-half coefficients also testify to the reliability of the ROL and Sand as all coefficients are .79 and greater.

Metropolitan Readiness Test

The 48 children receiving the MRT in September, 1978, were representative of the norms as indicated in Table 5. Therefore, the children participating in this study did not differ significantly in their performances on the MRT than did the population on which it was standardized.

An application of the Pearson Product Moment Correlation revealed correlations between the Sand and ROL that ranged from r = .61 for the females at the first interview to r = .81 for the females at the third interview. Correlations for males and the total group fell between these. The intercorrelations of the Sand, ROL, and MRT subtests are presented in Tables 6 and 7. All of the validity coefficients are highly significant. The ROL correlated most highly with Beginning Consonants, School Language, and Listening. The lowest correlates were Quantitative Concepts, Visual Matching, and Sound-Letter Correspondence. Finding Patterns and Quantitative Operations subtests had intermediate correlation values.

The correlations for the Sand and Metropolitan all cluster around .60 except for Quantitative Concepts which is lower. The six nonquantitative subtests on the MRT are summed to obtain the Pre-Reading Skills Composite; both the ROL and Sand have fairly high correlations with this Composite Score.

Table 8 shows the multiple correlations obtained for the MRT subtests when the ROL and Sand scores of the four administrations were used as predictors. These multiple R's were not appreciably different from the simple r's obtained in Tables 6 and 7. Therefore, the relative contributions

of the ROL and Sand for predicting the subtests of the MRT were examined. The scores of the ROL and Sand and the age and sex of the participant were entered into a stepwise regression analysis. Table 9 reveals the beta weights resulting from the stepwise regression analysis of the Sand, ROL, and MRT. The Beginning Consonants and Finding Patterns subtests and the Composite Score were predicted aporoximately equally by the Sand and ROL. The Sand was a better predictor of the Sound-Letter and Visual Matching, and the ROL was the better predictor of School Language and Listening. The quantitative subtests were predicted about equally by the ROL and Sand on the first two administrations, and the Sand accounted for very little prediction at the third administration.

In order to determine the relative contribution of the Sand and ROL for predicting the MRT at the third administration, partial coefficients were calculated controlling the ROL and Sand in turn. These results in Table 10 substantiate those obtained with the stepwise correlational analysis.

Canonical correlations presented in Table 11 were obtained by considering concurrent Sand and ROL scores as one variable set and the subtests of the MRT as the second variable set. Separate analyses were performed for the inclusion and exclusion of the two quantitative subtests. Results show extremely high correlations obtained by combining the ROL, Sand, and subtests of the MRT. Interpreting the squared canonical coefficients, it is apparent that 74% of the variability in the linear composite of the MRT subtests is shared with that of the composite of the Sand and ROL administered a year earlier, and the other relationships are nearly as strong.

It would appear, therefore, that the ROL, School Language, Listening, and Beginning Consonants measure some common characteristic. In addition, the Sand, Sound-Letter Correspondence, Visual Matching, and Finding Patterns also appear to have considerable common variance. This initial study seems to support the validity of the ROL and Sand.

Factor Analysis of the Sand

A factor analysis was performed for each administration of the Sand using the 24 items as variables. Items that had zero or nonsignificant variance were deleted from the analysis to produce a suitable correlation matrix. The items that had to be deleted at each administration were 1, 12, 14, and 18 for Sand 1; 14, 17, and 18 for Sand 2; 1, 12, 17, and 18 for Sand 3, and 1, 13, and 18 for Sand 4. The method of principal factoring with iteration was used to extract the initial factors, and terminal factors were obtained by obliquely rotating the resulting factors according to the direct oblimin criterion.

Tables 12 and 13 present the factor pattern matrix resulting from each analysis. The number of factors obtained for each administration was six, eight, five, and six for Sand 1-4, respectively, and similar factors are intuitively grouped in this table. The number of the factor refers to one of the four Sand administrations, and the letter refers to the factor's ordinal position. The numbers presented in italics in Tables 12 and 13 indicate the loads of .40 and larger. Only loadings of .40 or better were considered in determining factor structures since the sample was relatively small and dichotomous variables were used.

Certain items load high on certain factors and low on others and seem to group in four patterns. Pattern 1, which is called "Print-direction

Concepts," is composed of Items 3, 4, , 6, 7, 9, and 16. Pattern 2 is composed of Items 22, 23, 24, 19, 21, and 8 and referred to as "Letter-word Concepts." Items 10, 12, 13, 14, 20, 15, and 17 are grouped to form the third pattern called "Advanced-print Concepts." Pattern 4, "Book-orientation Concepts," is composed of Items 2 and 11. Data did not support the inclusion of Items 1 and 18 into any pattern; however, they were intuitively placed: Item 1 with Pattern 4 and Item 18 with Pattern 3. A summary of the item structure of the four patterns is presented in Table 14.

It was theorized that these patterns would be acquired or understood by children in a particular order. The first set of concepts proposed to be acquired was "Book-orientation Concepts" followed by "Print-direction Concepts," then "Letter-word Concepts," and finally "Advanced-print Concepts." To evaluate this hypothesis, the median percentage of correct responses to the items forming each pattern was determined for each administration of the Sand. Table 15 reveals these median percentages and it can be noted that the "Book-orientation Concepts" had already been acquired by most participants early in their kindergarten year when the study was first begun. The "Advanced-print Concepts" were acquired by only a few of the children early in their first-grade year. The acquisition of "Print-direction Concepts" and "Letter-word Concepts" reveal intermediate acquisition schedules. It is interesting to note that the percentage of acquisition of Patterns 1 and 2 approximately doubled during the course of the kindergarten year (Sand 1 through Sand 3). All patterns continued to reveal an increased percentage of responses from the end of kindergarten (Sand 3) to the beginning of the first-grade year (Sand 4).

Concepts acquired during the kindergarten year were not lost during the summer months when the children were not in school; in fact, there was a slight increase for all four patterns. Additional studies need to be conducted to support or refute the factor structures revealed by this study.

Summary

This study was begun to observe the development of children's oral language and concepts of print during the kindergarten year using the ROL and Sand tests. In addition, the Sand test was administered early in the first grade to the available original participants, and their scores on the MRT given at the beginning of first grade were obtained.

Results indicate that the children's performances on the ROL and Sand increased significantly across time. Age was not a significant factor for either test but sex was for the Sand, with the females scoring higher. The syntactical competence of kindergarten children continued to develop as measured by the ROL. If acquisition of all of the concepts of print that are incorporated in the Sand are necessary for success in formal reading (which is doubtful), then many first grade children do not have the necessary "cognitive entry behaviors" to succeed in formal reading instruction at the beginning of the year since the mean score at that time was only 13.0. It would appear that some of the concepts are, or can be, acquired after a child is reading, i.e., functions of punctuation. Some children may need more time and experience with print to acquire the concepts necessary for successful early reading.

The results of the test-retest and split-half analyses indicate that both the ROL and Sand maintain their stability across time. Therefore, these tests can be used with American children with confidence, and results confirm the findings of Clay with New Zealand children.

Since it may be important to identify children early in kindergarten who may experience difficulty when introduced to formal reading instruction, the performances on the ROL and Sand were correlated with performances on the MRT. The validity coefficients were remarkably significant. The high canonical correlations of the kindergarten administrations of the Sand and ROL with the subtests of the MRT support the careful application of Clay's tests in kindergarten to problems currently approached with the MRT in the first grade. Multiple, canonical, and partial correlational analyses reveal that the Sand and ROL may measure, to some degree, different aspects of early linguistic behavior even though they share considerable common variance. The discriminant validity of the ROL is demonstrated by its association with the Beginning Consonants, School Language, and Listening subtests of the MRT. These tests seem to assess the child's ability to attend to, and respond, on the basis of salient aspects of the spoken language. The Sand, Sound-Letter Correspondence, Visual Matching, and Finding Patterns, on the other hand, require the child to exhibit abilities to respond to aspects of language presented in the print medium.

The factor analysis revealed that some items on the Sand test appeared to group or load high on certain factors and group or load low on others, and these seemed to group themselves in four patterns. Subsequent analyses revealed that these patterns showed various schedules of acquisition by the

the children. The majority of children have acquired the "Book-orientation Concepts" by the early part of the kindergarten year; conversely, few children have acquired "Advanced-print Concepts" by the time they are in the beginning of first grade. More research needs to be conducted on these factors to verify them. In addition, validity of the Sand and subsequent measurements of reading behavior need to be established.

This is the beginning of what is hoped to be a long-term study of this group of children's performances on the ROL and Sand in kindergarten, on the MRT, and subsequent reading and achievement tests as they progress through school. If, through use of the ROL and Sand in kindergarten, children who are at risk for developing difficulties as they move into print can be identified, perhaps individual programs and assistance can be initiated to develop the oral language and concepts about print that are crucial for success in formal reading instruction.

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Table 1

Means and Standard Deviations of Record of Oral Language and Concepts About Print

Sex	Age	n	Testing Occasion: Nov., 1977	Jan., 1978	Mar., 1978
Record of Oral Language					
Males	63-66	8	18.6 ± 14.0	20.0 ± 13.9	22.6 ± 14.5
	67-70	13	22.2 ± 9.5	22.1 ± 9.7	25.3 ± 8.9
	71-75	8	20.8 ± 8.3	23.1 ± 8.8	25.4 ± 6.4
Females	63-66	8	24.6 ± 13.1	25.5 ± 14.0	25.6 ± 14.1
	67-70	6	20.5 ± 10.8	22.5 ± 12.0	24.2 ± 11.3
	71-75	13	23.8 ± 10.3	26.2 ± 10.4	28.5 ± 10.1
	Total	56	22.0 ± 13.5	23.4 ± 11.0	25.6 ± 10.8
Concepts About Print					
Males	63-66	8	5.9 ± 4.7	7.0 ± 4.6	9.5 ± 5.4
	67-70	13	7.1 ± 3.7	7.8 ± 3.6	9.4 ± 4.3
	71-75	8	6.3 ± 3.3	8.3 ± 2.6	10.9 ± 3.4
Females	63-66	8	6.3 ± 3.6	7.8 ± 4.0	9.9 ± 4.2
	67-70	6	9.3 ± 3.2	10.8 ± 1.9	12.2 ± 3.3
	71-75	13	10.5 ± 4.3	11.4 ± 4.2	13.1 ± 4.0
	Total	56	7.7 ± 4.2	8.9 ± 3.9	10.8 ± 4.3

Table 2

Percentage of Sand Items

Answered Correctly

	Sand Items	Q	Sand Administrations 1	2	3	4
1.	Orientation of book	3.00	100	98	100	100
2.	Print carries message	25.64***	73	90	92	98
3.	Directional (top left)	24.62***	51	59	75	82
4.	Directional (left to right)	40.00***	41	57	78	82
5.	Directional (return sweep)	37.23***	33	55	73	79
6.	Word by word pointing	26.68***	11	31	37	53
7.	First and last	32.62***	43	63	71	82
8.	Picture inversion	15.48**	67	53	76	82
9.	Inverted print	35.05***	25	24	33	63
10.	Inverted line sequence	12.64*	6	2	8	18
11.	Left before right page	5.43	78	82	82	90
12.	Incorrect word sequence	2.00	0	2	0	2
13.	Incorrect letter order	4.00	2	2	8	4
14.	Incorrect letter order	3.00	0	0	2	2
15.	Punctuation (?)	12.96*	14	6	4	22
16.	Punctuation (.)	15.19**	24	22	33	49
17.	Punctuation (,)	12.00*	0	0	0	8
18.	Punctuation (")	.00	0	0	0	0

Table 2 - Continued

Sand Items	Q	Sand Administrations 1	2	3	4
19. Capital/lower case	27.35***	39	55	67	71
20. Reversible words (was,no)	31.66***	8	8	14	37
21. One letter, two letters	23.68***	65	80	86	98
22. One word, two words	36.24***	27	20	47	63
23. First and last letter	14.44**	37	51	61	65
24. Capital letter	26.52***	24	20	37	57

Note Q is approximately distributed as χ^2 with df = 3 for this analysis.

* $p < .05$

** $p < .01$

*** $p < .001$

Table 3

Test-retest Reliability Coefficients

of ROL and Sand Tests

Test	Group	Sand 2	Sand 3	Sand 4
	Males	.86	.81	.77
Sand 1	Females	.90	.87	.77
	Total	.89	.85	.78
	Males		.83	.71
Sand 2	Females		.88	.72
	Total		.86	.73
	Males			.67
Sand 3	Females			.82
	Total			.75
		ROL 2	ROL 3	
	Males	.94	.95	
ROL 1	Females	.91	.94	
	Total	.92	.94	
	Males		.94	
ROL 2	Females		.96	
	Total		.95	

Table 4

Corrected Split-half Reliability Coefficients of ROL and Sand Tests

Test	Males	Females	Total
ROL 1	.94	.95	.94
ROL 2	.95	.95	.95
ROL 3	.94	.96	.95
Sand 1	.79	.91	.86
Sand 2	.80	.85	.84
Sand 3	.89	.86	.88
Sand 4	.87	.80	.85

Table 5

Comparison of Sample and Norm Means

of the Metropolitan Readiness Subtests

Subtest	Sample		Norm		
	$\bar{X}$	SD	μ[1]	σ	t
Composite	49.7	16.8	49.7	14.4	.00
Beg. Cons.	9.6	3.6	8.9	3.6	1.35
Soun. Let.	9.7	5.0	10.5	7.4	1.18
Vis. Mat.	6.7	2.2	6.8	2.2	.31
Find. Pat.	11.4	4.6	11.0	4.2	.66
Sch. Lang.	6.7	2.0	6.8	1.8	.38
List.	6.1	2.2	5.7	1.9	1.48
Quan. Con.	5.4	2.0	5.3	2.0	.34
Quan. Op.	10.3	3.4	9.9	3.5	.78

[1]The normative data were taken from the Metropolitan Readiness Test Manual, Level 2, Form P, 1974. Harcourt Brace Javanovich, Inc.

Table 6

Correlations of Sand with Record of Oral Language and Metropolitan Readiness Test

	Sand Administration			
Scale	Sand 1	Sand 2	Sand 3	Sand 4
ROL 1	.66	.62	.69	.58
ROL 2	.65	.65	.72	.64
ROL 3	.67	.65	.72	.66
Composite	.72	.69	.71	.61
Beg. Cons.	.59	.60	.56	.52
Soun. Let.	.63	.66	.57	.71
Vis. Mat.	.58	.56	.59	.47
Find. Pat.	.59	.59	.61	.57
Sch. Lang.	.59	.48	.60	.50
List.	.64	.55	.62	.51
Quan. Con.	.46	.41	.36	.44
Quan. Op.	.67	.65	.57	.61

Table 7

Correlations of Record of Oral Language with Metropolitan Readiness Test

	ROL Administration		
Scale	ROL 1	ROL 2	ROL 3
Composite	.62	.68	.66
Beg. Cons.	.66	.66	.67
Soun. Let.	.41	.52	.48
Vis. Mat.	.43	.44	.45
Find. Pat.	.50	.55	.52
Sch. Lang.	.67	.66	.65
List.	.65	.58	.60
Quan. Con.	.43	.39	.41
Quan. Op.	.53	.55	.60

Table 8

Multiple Correlations

	Predictors		
Criterion	ROL 1 Sand 1	ROL 2 Sand 2	ROL 3 Sand 3
Composite	.75	.75	.74
Beg. Cons.	.69	.69	.68
Soun. Let.	.63	.67	.58
Vis. Mat.	.59	.57	.59
Find. Pat.	.61	.63	.62
Sch. Lang.	.70	.67	.68
List.	.71	.63	.66
Quan. Con.	.49	.44	.42
Quan. Op.	.68	.67	.63

Table 9

Beta Weights Resulting from Stepwise Regression Analysis of Sand, ROL, and Metropolitan

Criterion	Sand	ROL	Sex	Age	Rs
		November, 1977, Sand and ROL			
Composite	.48	.30	-.11	.06	.76
Beg. Cons.	.37	.42	.08	-.12	.70
Soun. Let.	.56	.04	-.13	.02	.64
Vis. Mat.	.50	.10	.08	.11	.60
Find. Pat.	.34	.28	-.12	.14	.63
Sch. Lang.	.20	.53	-.21	-.03	.73
List.	.24	.50	-.11	.16	.73
Quan. Con.	.26	.26	.07	.17	.52
Quan. Op.	.31	.33	-.09	.38	.76
		January, 1978, Sand and ROL			
Composite	.36	.43	-.11	.05	.76
Beg. Cons.	.43	.40	.11	-.18	.72
Soun. Let.	.50	.19	-.13	.02	.68
Vis. Mat.	.46	.14	.08	.10	.58
Find. Pat.	.31	.33	-.10	.11	.64
Sch. Lang.	-	.66	-.23	-.03	.70
List.	.19	.44	-.10	.13	.65
Quan. Con.	.23	.22	.08	.15	.47
Quan. Op.	.31	.31	-.07	.34	.74

Table 9 Cont.

Criterion	Sand	ROL	Sex	Age	Rs
		March, 1978, Sand and ROL			
Composite	.39	.38	-.18	.07	.77
Beg. Cons.	.21	.53	-	-.12	.69
Soun. Let.	.36	.23	-.22	.08	.63
Vis. Mat.	.52	.06	.03	.12	.60
Find. Pat.	.39	.24	-.16	.11	.65
Sch. Lang.	.21	.52	-.26	-.08	.72
List.	.29	.39	-.15	.12	.69
Quan. Con.	.06	.35	-	.19	.46
Quan. Op.	.07	.52	-.17	.39	.76

Table 10

Partial Correlations

Metropolitan Subtest	Partial Coefficients			
	Sand 3 (ROL 3 controlled)		ROL 3 (Sand 3 controlled)	
	Zero Order	First Order	Zero Order	First Order
Composite	.71	.45	.66	.31
Beg. Cons.	.56	.16*	.67	.46
Soun. Let.	.57	.37	.48	.12*
Vis. Mat.	.59	.44	.45	.04*
Find. Pat.	.61	.40	.52	.15*
Sch. Lang.	.60	.25*	.65	.40
List.	.62	.34	.60	.28
Quan. Con.	.36	.10*	.41	.24*
Quan. Op.	.57	.25*	.60	.33

*$\underline{p}$>.05

Table 11

Canonical Correlations of the Record of Oral Language and Concepts About Print with the Metropolitan Readiness Subtests

Test Date	Coefficients for Canonical Variables: First Set		Second Set								Canon. Corr.
	ROL	Sand	Beg. Cons.	Soun. Let.	Vis. Mat.	Find. Pat.	Sch. Lang.	List.	Quan. Con.	Quan. Op.	
With ALL Metropolitan Subtests											
Nov., 1977	.57	.52	.43	.09	.04	-.09	.31	.36	.22	-.12	.87
Feb., 1978	.59	.51	.46	.26	.04	-.05	.28	.21	.27	-.25	.85
Mar., 1978	.62	.46	.45	.10	.10	-.05	.35	.26	.26	-.26	.84
With Pre-reading Subtests of the Metropolitan											
Nov., 1977	.61	.49	.45	.11	.02	-.05	.27	.45			.86
Feb., 1978	.62	.48	.44	.29	-.02	.01	.24	.31			.83
Mar., 1978	.61	.47	.42	.13	.04	.01	.30	.36			.82

Table 12

Item Structure of Patterns 1 and 2

Item	Pattern 1						Pattern 2					
	1A	1E	2A	3A	4A	4F	1B	2B	2C	2F	3B	4C
1			.17					.03	.08	.04		
2	.46	-.18	.19	.21	.02	-.10	.13	.05	-.04	.02	-.00	.02
3	.70	.17	.86	.66	.95	-.07	-.07	-.05	-.05	-.01	-.03	.04
4	.88	-.07	.91	.80	.76	-.07	.01	-.04	-.07	-.02	-.06	.03
5	.97	-.08	.84	.73	.83	-.06	.03	.00	-.04	-.02	.01	-.02
6	-.02	.44	.49	.29	.43	-.40	.29	.18	-.04	-.14	.21	.20
7	.56	.29	.48	.65	.11	-.06	.07	.03	.00	.03	-.01	-.04
8	-.04	.19	-.10	.12	-.35	-.29	.09	-.09	-.14	-.05	.11	.20
9	.20	.38	.41	.12	.39	-.49	.18	.14	-.17	-.12	.19	.12
10	.00	-.13	.14	.04	-.08	-.44	1.02	-.03	-.71	.08	.69	.39
11	.16	.22	.09	.00	.09	.02	.06	.00	.34	-.04	.01	.09
12			-.01		.00	-.29		.80	-.03	.11		-.04
13	.14	-.03	.02	-.10			.55	-.13	.05	-.93	1.01	
14				-.05	.05	.03					.74	.70
15	.02	.02	-.22	-.39	-.09	.13	-.07	-.04	.01	.08	-.01	.57
16	.47	.47	-.09	.16	.08	-.49	.16	.37	-.38	-.20	.21	-.24
17	-.11	-.09			.07	-.02	.03					.55
18												
19	.05	-.15	-.02	.07	.47	.24	.08	.09	-.14	-.07	-.02	.06
20	-.10	.18	.11	.12	-.03	-.38	.84	.50	.03	-.44	.40	.29

Table 12- Continued

Item	Pattern 1						Pattern 2					
	1A	1E	2A	3A	4A	4F	1B	2B	2C	2F	3B	4C
21	.19	-.09	.08	-.01	-.04	-.08	-.31	-.38	-.11	.23	-.47	.03
22	-.07	.42	.32	.06	.45	-.08	-.11	.35	.21	.15	-.11	.22
23	.36	.13	.15	.09	.35	-.07	-.06	-.19	-.07	-.12	-.03	.14
24	-.10	.12	.10	-.06	.31	-.11	.08	.10	.10	-.12	-.01	-.20
Eigen.	5.07	.70	5.18	5.96	6.09	.61	2.45	1.88	1.37	.92	2.46	1.27
% Var.	45.4	6.2	40.9	53.9	53.4	5.3	21.9	14.9	10.8	7.3	22.3	11.2

Table 13

Item Structure of Patterns 3 and 4

Item	Pattern 3									Pattern 4			
	1C	1D	2D	2E	2H	3C	3D	4B	4E	1F	2G	3E	4D
1			.04	.05	-.32						-.10		
2	-.06	.15	-.02	.02	-.03	-.01	.06	-.13	-.18	.40	.73	-.58	.60
3	.04	-.07	-.05	-.04	-.02	.05	-.08	-.21	-.07	.17	.17	-.43	.08
4	.01	-.05	-.11	-.09	-.03	.16	.03	-.01	-.14	.05	.11	-.23	.17
5	-.00	-.09	-.06	-.12	-.07	.10	-.01	.00	.02	-.08	.08	-.21	.13
6	.04	-.10	.34	.10	.06	.27	-.21	.14	.21	.02	-.04	-.07	.01
7	.16	.09	.19	.00	-.17	.26	-.04	.42	.01	.07	.29	-.18	.48
8	.07	.56	-.02	-.20	-.70	.54	.33	.48	-.14	.05	.10	-.08	-.10
9	.29	-.05	.21	-.41	-.04	.32	-.31	.21	-.36	.08	-.10	-.11	-.03
10	.09	.00	.05	.02	.01	.07	.07	-.05	.06	.09	-.16	.02	-.00
11	.11	.32	.12	-.01	.09	-.10	-.15	-.05	.08	.36	.89	-1.01	.65
12			-.13	-.13	.08			-.00	.04		.07		.02
13	.08	-.04	.00	-.09	.01	-.02	.03			-.10	.01	-.04	
14						-.09	.04	-.19	-.02			-.06	-.03
15	.03	-.04	.37	-.08	-.05	.30	.00	.20	.03	.47	.06	-.18	.13
16	-.26	.13	.09	.18	-.20	.06	.21	.10	.12	-.09	.20	-.26	.22
17	-.06	.32						.03	.03	-.03			.02
18													
19	.76	.06	.43	-.16	.10	.22	-.58	.39	.04	.03	.03	-.31	.27
20	-.04	.12	.13	-.15	.13	.30	-.30	.26	.25	-.03	-.00	.10	.23

Table 13- Continued

Item	Pattern 3									Pattern 4			
	1C	1D	2D	2E	2H	3C	3D	4B	4E	1F	2G	3E	4D
21	-.02	.52	.09	-.10	.18	.24	.34	-.04	.41	.15	.22	-.10	-.04
22	.27	.07	.37	-.13	.07	.56	-.14	.42	.39	.28	-.07	-.10	-.20
23	.42	.53	.72	.11	-.10	.47	.01	.46	-.30	-.35	.04	-.03	.04
24	.71	-.13	.00	-.92	-.13	.68	-.09	.60	.19	.02	-.02	.09	-.13
Eigen.	1.45	.96	1.24	.92	.50	1.29	.71	1.88	.74	.55	.65	.63	.83
% Var.	12.9	8.6	9.9	7.3	4.0	11.7	6.4	16.4	6.4	4.9	5.1	5.7	7.2

Table 14

Item Structure of Sand Patterns

Pattern 1 - Print-direction Concepts	
3. Start at top left	7. First and last
4. Move left to right	9. Movement along inverted print
5. Line to line return sweep	16. Punctuation (.)
6. Word by word pointing	
Pattern 2 - Letter-word Concepts	
22. One word, two words	19. Capital/lower case letters
23. First and last letter	21. One letter, two letters
24. Capital letter	8. Bottom of inverted picture
Pattern 3 - Advanced-print Concepts	
10. Inverted line sequence	20. Reversible words (was, no)
12. Word sequence incorrect	15. Punctuation (?)
13. Letter order incorrect	17. Punctuation (,)
14. Letter order incorrect	18.[1] Punctuation (")
Pattern 4 - Book-orientation Concepts	
1[1] Orientation of book	11. Left page before right page
2. Print carries message	

[1]Items 1 and 18 were placed intuitively.

Table I5

Median Percentage of Correct Responses to Items of Sand Patterns

	Sand Administrations			
Pattern	1	2	3	4
1	33	55	71	79
2	38	52	64	68
3	1	2	3	6
4	78	90	92	98